Oct. 7, 1958 C. L. MOSES 2,855,088

ASSEMBLED ARTICLE TRANSFER DEVICE

Filed Aug. 23, 1956

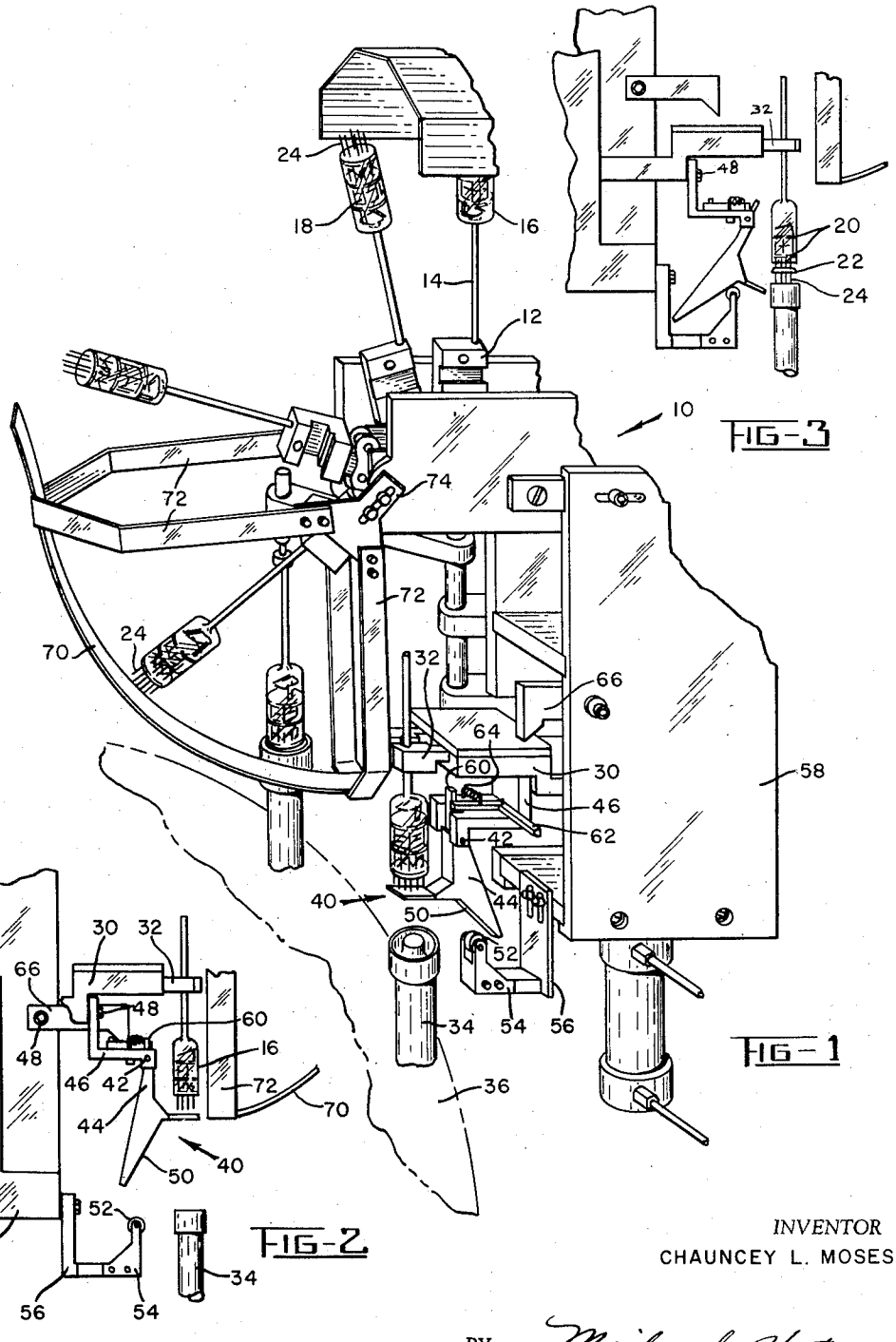


FIG-3

FIG-1

FIG-2

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United States Patent Office 2,855,088 Patented Oct. 7, 1958

2,855,088

ASSEMBLED ARTICLE TRANSFER DEVICE

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Application August 23, 1956, Serial No. 605,811

8 Claims. (Cl. 198—20)

This invention relates to assembled article, transfer devices.

In the manufacture of electron tubes, one of the steps consists of integrating a stem comprising a wafer with electrodes mounted thereon, hereinafter collectively termed a mount, and an enclosing envelope or bulb. The integration is effected, in the case of glass bulbs and glass wafers by fusing the edges of the two together. In the case of glass stem and metal envelope the joining of the two is effected by brazing or other processes. In the processing of the assembly it is often necessary to invert an assembled mount and bulb in such fashion that there is a possibility of the mount slipping downwardly out of the bulb. For example, this could occur where assembled but not integrated mounts and tubulated bulbs, i. e., bulbs with tubulation attached at the dome of the bulb for subsequent evacuation of the bulb, are conveyed on an endless conveyor, with the tubulation end down, and are then inverted for transfer to pegs of a sealing machine, tubulated end up. In that event, loose mounts would slide out of the bulb causing faulty operation of the sealing machine and loss of tube material. It should be understood that normally the mount by reason of its slightly resilient insulating spacers, usually made of mica, fits frictionally within its bulb; but occasionally the fit is loose and losses could therefore occur.

It is an object of this invention to insure that all mounts remain associated with the bulb during the time that the mount may possibly slip out of the bulb and until the mount and bulb are delivered to the peg or other receiver.

It is a more specific object of the invention to provide means for retaining a mount within a bulb during the time that an assembly of the two is being inverted by conveyor and during the time that the assembly is transferred from the conveyor to the machine that receives the mount and bulb assembly.

It is also a specific object of this invention to associate with the retaining means, a movable delivery platform forming part of a transfer mechanism to transfer an assembly, with loose mount, from the conveyor to whatever receiving means is employed.

These and other objects will be more fully understood after consideration of the following description when taken in conjunction with the accompanying drawing in which:

Fig. 1 is a perspective view of a portion of a conveyor equipped with the transfer and assembly retaining guard platform of the invention, part of a sealing machine being also shown.

Fig. 2 is a fragmentary view showing the platform in its position underlying a tube wherein there is a tight fit of mount in its bulb, while the tube is being transferred from the conveyor to a sealing peg, the transfer device being at the limit of its up stroke.

Fig. 3 is a fragmentary view showing the platform in its position underlying a tube with a loose mount therein while the tube is being transferred from the conveyor to a sealing peg, the transfer device being at the limit of its down stroke.

The mechanism of this invention is an improvement on the mechanism disclosed in the application of John Bullers and Chauncey L. Moses for "Preheater to Sealing Machine Transfer Device" filed December 16, 1955, bearing Serial No. 553,647 and patented February 4, 1958, Patent No. 2,821,810.

In general, the mechanism comprises an endless conveyor having upper and lower horizontal runs travelling in a vertical plane and adapted to carry tubulated bulbs with mounts in the bulbs. These pass through a heater, as explained in the referred to disclosure, tubulated end down, and are then inverted and transferred to the jaws of a vertically reciprocatable transfer device which transfers the bulb and mount assembly from the conveyor and onto a peg of a sealing machine, tubulated end up. Associated with the conveyor and positioned parallel with and spaced from the bight of the conveyor is an arcuate guard along which the stem leads of a mount will ride in the event the mount partially slips out of the bulb. Associated with the transfer device is a pivotable platform which in the up position of the transfer device forms a continuation of the guard and in the down position pivots out of the way of the bottom of the stem leads at a time when the transfer device is so close to the peg of the sealing machine that in the case of loose mounts, the mount cannot fall much farther out of the bulb. It should be understood that with tight fitting mounts, the stem leads do not ride on the guard nor rest on the platform.

Referring to the drawings in detail there is illustrated a conveyor **10** lying in a vertical plane, with horizontal runs and arcuate connecting bight portions and with arms **12** which, in any suitable manner, frictionally engage tubulations **14** of bulbs **16**. Each of these bulbs has a mount **18** therein with holding means, such as the mica spacers **20** forming a common construction of electron tubes, and with a wafer **22** for sealing to the bulb **16**. The mount also has stem leads **24** passing through the wafer and connected to electrodes forming part of the mount. Associated with the conveyor is a vertically reciprocable carrier **30** which in the up position of the carrier, that is to say in the position shown in Fig. 2, is adapted to receive a bulb tubulation between a pair of jaws **32** on the carrier and transport the same down onto one of a series of pegs **34** mounted on the periphery of a turret **36** of a sealing machine. In the down position of the carrier, see Fig. 3, the jaws **32** are operated to release the tubulation, whereupon the carrier again moves upward to tubulation receiving position. All of this is described more in detail in the aforesaid patent.

Movable with the carrier is a pivoted platform **40** pivoted by means of pivot pin **42** passing through a vertical arm **44** integral with the platform and through ears of an angled support **46** vertically adjustably secured to the carrier **30** by conventional bolt and slot connection, the bolt being shown at **48**. The platform also has an integral downwardly directed cam **50** which on its down stroke is engaged by a roller **52** mounted in ears on a bracket **54** laterally adjustable on an angle bracket **56** which in turn is vertically slidably mounted on a part fixed to the frame **58** of the machine. The vertical arm **44** has a finger **60** projecting upwardly and beyond the upper horizontal face of the angled support **46**. Pivoted on said face is a detent in the form of a bell crank lever **62** one arm of which is spring urged to position itself behind the finger **60**. When the cam **50**, in the downward movement of the carrier **30**, engages the roller **52**, the platform is pivoted out of the path of movement of the bulb and is prevented from moving back to horizontal position by reason of finger **60** engaging the front end

face of bell crank lever 62 which by reason of its spring has snapped into blocking position behind the finger, the limit of rotational movement of the spring being the engagement of the lever with the pin 64 on the face of the angled lever which supports the fixed end of the spring, or some equivalent stop. On the upstroke of the carrier, the bell crank lever is engaged by a cam bar 66 laterally adjustably mounted on the frame 58 and is moved against its spring to platform release position, whereupon by gravitational action of the platform it again assumes a horizontal position, the finger 60 engaging a part on the angle bracket to limit the return movement of the platform. On downward movement of the carrier, the bell crank lever is cocked ready to again perform its locking function behind the finger 60.

In the full up position of the carrier 30 the upper face of the platform 40 is on a level with the lower end of arcuate guard 70. This guard conforms to the curvature of the conveyor at the bight portion and is suitably fixed to the frame of the machine, as by straps 72 affixed to gusset plates 74 in turn are adjustably mounted on a fixed frame part of the conveyor.

The guard is positioned so that normally with tight fit of the mount in the bulb, the leads 24 do not contact the guard. However, should a loose mount exist in any of the bulbs, it will slip partially out of its bulb and come to sliding engagement with the arcuate guard. Then the mount will slide onto and be supported by the platform while the bulb is held, through its tubulation, by the jaws 32. On downward movement of the carrier 30 with the jaws 32 and the platform, the cam 50 will engage the roller 52, and the platform will withdraw to allow the mount and now also released bulb to drop onto the underlying peg 34. The platform is now held locked out of the way of bulb 16 by bell crank lever 62 as the carrier and platform move upward, until the upper cam bar 66 is reached, whereupon the bell crank lever is cocked and the platform gravitates to horizontal position. Tightly held mounts in bulb 16 will engage neither the guard 70 nor the platform 40.

Having thus described the invention, what is claimed is:

1. In a transfer device, a vertically reciprocatable carrier, holding means on said carrier adapted to hold an assembly comprised of a two part telescoped article wherein the parts are frictionally held against shifting relative to one another, a platform pivoted to the carrier and normally urged to horizontal position below the holding means and in position to assist in holding a portion of the assembly during downward reciprocation of the carrier, a cam in the path of downward movement of the platform to engage a portion fixed with respect to the platform to move the platform to one side of the holding means.

2. In a transfer device, a vertically reciprocatable carrier, a means on said carrier adapted to hold an assembly comprised of a two part telescoped article wherein the parts are frictionally held against shifting relative to one another, a receiver below the holding means adapted to receive the assembly after downward movement of the carrier and subsequent release of the holding means, a platform pivoted to the carrier normally urged to horizontal position below the holding means and in position to assist in holding a portion of the assembly during downward reciprocation of the carrier, a cam in the path of downward movement of the platform to engage a portion fixed with respect to the platform to move the platform to one side of the holding means, and to a position out of the path of movement of the assembly from the holding means to the receiver.

3. In a transfer device, a vertically reciprocatable carrier, a means on said carrier adapted to hold an assembly comprised of a two part telescoped article wherein the parts are frictionally held against shifting relative to one another, a receiver below the holding means adapted to receive the assembly after downward movement of the carrier and subsequent release of the holding means, a platform pivoted to the carrier normally urged to horizontal position below the holding means and in position to assist in holding a portion of the assembly during downward reciprocation of the carrier, a cam in the path of downward movement of the platform to engage a portion fixed with respect to the platform to move the platform to one side of the holding means and to a position out of the path of movement of the assembly from the holding means to the receiver, a detent movable with the platform in its downward movement and means urging said detent to position to engage the tilted platform to maintain the same in its tilted position out of the way of the assembly during upward movement of the carrier and platform.

4. In a transfer device, a vertically reciprocatable carrier, a means on said carrier adapted to hold an assembly comprised of a two part telescoped article wherein the parts are frictionally held against shifting relative to one another, a receiver below the holding means adapted to receive the assembly after downward movement of the carrier and subsequent release of the holding means, a platform pivoted to the carrier normally urged to horizontal position below the holding means and in position to assist in holding a portion of the assembly during downward reciprocation of the carrier, a cam in the path of downward movement of the platform to engage a portion fixed with respect to the platform to move the platform to one side of the holding means and to a position out of the path of movement of the assembly from the holding means to the receiver, a detent movable with the platform in its downward movement, means urging said detent to position to engage the tilted platform to maintain the same in its tilted position out of the way of the assembly during upward movement of the carrier and platform, and a cam bar at the upper limit of travel of the platform to engage and shift the detent to platform release position to allow the platform to gravitate to horizontal position.

5. In a transfer device, a vertically reciprocatable carrier, means on said carrier adapted to hold an assembly comprised of a two part telescoped article wherein the parts are frictionally held against shifting relative to one another, a receiver below the holding means adapted to receive the assembly after downward movement of the carrier and subsequent release of the holding means, a platform pivoted on the carrier normally urged to horizontal position below the holding means to assist in holding a portion of the assembly during downward reciprocation of the carrier, a cam in the path of downward movement of the platform to engage a fixed portion of the platform to move the platform to one side of the holding means and to a position out of the path of movement of the assembly from the holding means to the receiver, a finger extending from the platform, a bell crank lever mounted on the carrier having one arm spring urged to locking position behind the finger, and holding the platform in tilted position when it is tilted by the cam, and a cam bar in the path of movement of the second arm of the bell crank lever operative to release the finger from engagement with the first arm of the bell crank lever on upward movement of the carrier and engagement of said second arm with the cam bar.

6. In a conveyor and transfer device, an endless conveyor in a vertical plane and having horizontal runs with an arcuate bight portion connecting the horizontal runs, an arcuate guard conforming in curvature to the curvature of the bight portion and spaced from the conveyor, a vertically reciprocatable carrier having means to engage articles comprised of telescoped frictionally retained portions carried by the conveyor and move them downward away from the carrier, and a platform movable with the carrier which in the up position of the carrier forms a continuation of the guard, the guard functioning to maintain within the rest of the article any portion of the

assembled article which may have partially slipped out, and the platform functioning during downward movement of the carrier to retain the shifted portion against further slipping out of the remainder of the article.

7. A conveyor having horizontal runs and a vertical bight portion connecting the runs, a fixed arcuate guard conforming in curvature to and spaced from the bight portion, a vertically reciprocatable carrier having means to engage articles having telescoped portions frictionally held together carried by the conveyor and transport them downwardly and a platform movable with the carrier having a horizontal portion level with and close to the lower end of the guard, when the carrier is at its position whereat the engaging means grasps an article on the conveyor.

8. A conveyor having horizontal runs and a vertical bight portion connecting the runs, a fixed arcuate guard conforming in curvature to and spaced from the bight portion, a vertically reciprocatable carrier having means

to engage articles having telescoped portions frictionally held together carried by the conveyor and transport them downwardly and a platform movably mounted on the carrier and movable with the carrier having a horizontal portion level with and close to the lower end of the guard, when the carrier is at its position whereat the engaging means grasps an article on the conveyor, an article receiver below the carrier and means to shift the platform from beneath an article on approach movement of the platform to the receiver.

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